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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,696	02/12/2002	David C. Gerstenberger	22927-7027	1769
7590	11/05/2003			
David G. Beck McCutchen, Doyle, Brown & Enersen, LLP Three Embarcadero Center, 28th Floor San Francisco, CA 94111			EXAMINER MENEFFEE, JAMES A	
			ART UNIT 2828	PAPER NUMBER

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/076,696	Applicant(s) GERSTENBERGER ET AL.	
	Examiner James A. Menefee	Art Unit 2828	<i>Aw</i>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Paul IP
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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 recites the limitation "a cesium lithium borate crystal cooled to a temperature in the range..." in lines 13-14. This limitation is unclear, as there is no structure in the claims that can accomplish such a cooling. The applicant must add more structure to positively recite an element that will perform such cooling, for example by including a cooler (as mentioned in p. 15 lines 1-3 of the specification) or by including means plus function limitations similar to that of claim 9.

Claims 16-17 are rejected as depending on the rejected base claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-4, 6-8, 10-11, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umezu et al. (previously cited US 5,862,163) in view of Narusawa et al.

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(previously cited US 6,033,223).

Regarding claims 1 and 8, Umezu discloses an apparatus for generating ultraviolet light comprising an Nd:YAG laser 2, means 3 for frequency doubling the output of the laser 2 to produce a second harmonic beam, and means 4 for frequency doubling the second harmonic to produce a fourth harmonic beam using a first cesium lithium borate (CLBO) crystal oriented for non-critical phase matching (Fig. 2,4, and discussion thereof). It is not disclosed that the Nd:YAG laser is tunable and has output at ~946 nm. Narusawa teaches that such a laser is known to be used in frequency doubling devices. It would have been obvious to one skilled in the art to substitute the laser of Narusawa for the laser in Umezu, because the use of the different laser will not change the operation of the device, only the output wavelength, and thus the lasers are art-known substitutes. Should this obvious substitution be made, then the wavelengths of each beam will be as claimed.

Regarding claims 3, 7, 10, and 14, the CLBO crystal 4 may be disposed in a container of dry inert gas such as nitrogen, xenon, or the like.

Regarding claims 4 and 11, the CLBO crystal 4 may be disposed in a vacuum chamber 6.

Regarding claims 6 and 13, Umezu further discloses that the output of the CLBO crystal 4 may be sum frequency mixed with laser light of ~1077 nm to produce an output beam. Should the obvious substitution be made, as shown in the rejection of claims 1 and 8 above, then the output wavelengths of the beams will be as claimed.

Claims 2, 9, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umezu and Narusawa as applied to claims 1, 3-4, 6-8, 10-11, and 13-14 above, and further in

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view of Hargis et al. (US 6,101,201). Umezu and Narusawa teach the limitations of the claims as shown above, but do not teach that the CLBO crystal should be cooled to -10°C to -20°C. Hargis teaches that a harmonic generating crystal should be maintained near the optimum phase matching temperature (col. 13 lines 1-17). It would have been obvious to one skilled in the art to maintain the CLBO crystal at the optimum phase matching temperature to improve the efficiency and stability of the frequency conversion, as taught by Hargis.

Applicant teaches that the optimum phase matching temperature of the CLBO crystal in this system is between -10°C and -20°C (p. 13 lines 28-32). While the Examiner cannot rely on the applicant's experimental values, the Examiner contends that it would have only involved routine experimentation by one skilled in the art to determine this optimum phase matching temperature. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Here, the phase matching temperature is a result effective variable, as it will effect a change in efficiency and stability of the frequency conversion, as shown above by Hargis. It thus would have involved only routine skill in the art to cool the CLBO crystal to this desired temperature value of the optimum phase matching.

Regarding claims 16-17, Umezu teaches the laser medium may be as claimed.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umezu and Narusawa as applied to claims 1, 3-4, 6-8, 10-11, and 13-14 above, and further in view of Fermann et al. (previously cited US 5,880,877). Umezu and Narusawa teach the limitations of the claims as shown above, but do not teach confocal focusing of the second harmonic beam into

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the CLBO crystal 4. Fermann teaches that it is known to provide confocal focusing to a beam before putting it through a frequency doubler (col. 8 lines 1-25). It would have been obvious to one skilled in the art to use confocal focusing because this leads to more efficient frequency conversion, as taught by Fermann.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Umezu in view of Narusawa, and further in view of Moulton (previously cited US 5,740,190). Umezu and Narusawa teach the limitations of the claims as shown above, but do not teach that the second CLBO crystal is used for sum frequency mixing the lasers as claimed. As shown in the above rejection of claims 1 and 8, it would have been obvious to one skilled in the art to substitute a specific type of laser. Therefore, it would have been obvious to one skilled in the art to provide sum frequency mixing of the lasers as claimed by way of an obvious art known substitution of the lasers as claimed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



JM
October 22, 2003



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